

## CD2 SERIES

Duct Mount All-in-One CO<sub>2</sub>, RH, Temp, VOC and PM Sensing



CD2 Series Air Quality Sensors are duct mount all-in-one sensors for monitoring air quality. The device combines CO<sub>2</sub>, temperature, humidity, VOC and particulate matter (PM) sensing into a single unit to ensure a building's optimum air quality and energy efficiency.

Each device is an active sensor that converts a measurement into one of the following output options:

- Analog output: 4-20 mA, 0 to 5 Vdc or 0 to 10 Vdc
- Protocol output: BACnet MS/TP, Modbus RTU

Different models are available based on application requirements for lower-cost installations.

CD2 is available with an LCD display option on selected models. See Ordering Information for details.

### SPECIFICATIONS

#### OPERATING & STORAGE ENVIRONMENT

Operating Temp. Range	0 to 50 °C (32 to 122 °F)
Operating Humidity Range	0 to 95% RH (non-condensing)
Storage Temp. Range	-25 to 70 °C (-13 to 158 °F)
Storage Humidity Range	0 to 95% RH (non-condensing)
Power Supply	3-wire volt mode: 20 to 30 Vdc, 24 Vac, 50 to 60 Hz
Output	Analog: selectable 4 to 20 mA, 0 to 5 Vdc, 0 to 10 Vdc Protocol: BACnet MS/TP, Modbus RTU
Power Consumption	See Maximum Power Consumption table, next page
Tube Length	200 mm
Medium	Neutral gas, air
Housing Material	Polycarbonate; flammability rating UL 94 V0
Mounting Location	For indoor use only. Not suitable for wet locations.
IP Rating	IP 65
Protection Class	Class III

#### CO<sub>2</sub> SENSOR

Sensor Type	Non-dispersive infrared (NDIR), diffusion sampling
Output Range	Analog models: 0 to 2000/5000 ppm (selectable) Protocol models: 0 to 5000 ppm
Accuracy	±30 ppm ±3% of measured value
Repeatability	±20 ppm ±1% of measured value
Response Time	<60 seconds for 90% step change
Calibration	Field calibration support

## BACnet & Modbus Easy to install

Embedded BACnet and Modbus communication protocols for easy systems integration

Latch-on sensor cover and screwless terminal block wiring with spring actuator

## Self-calibrating

Innovative self-calibration algorithm...easy to maintain

## Field selectable

Field-selectable outputs for operation flexibility

## Dual-beam NDIR CO<sub>2</sub> sensor

Dual-beam, non-dispersive infrared technology (NDIR) repeatable to ±20 ppm ±1% of measured value... high accuracy measurement

## Field replaceable

Replace RH element and temp transmitter in the field... maintain accuracy and minimize downtime and cost

### APPLICATIONS

- HVAC systems
- Indoor air quality monitoring
- Life sciences applications
- Key component for the LEED green building program and WELL Building Standard\*

\*Leadership in Energy and Environmental Design (LEED) is a registered trademark of the US Green Building Council. The WELL Building Standard is a trademark of the International WELL Building Institute in the United States and other countries..

#### VOC SENSOR OPTION

Sensor Type	Solid state	
Output Range	0 to 100% AQI for VOC	
Accuracy	±15% sensor-to-sensor variation	
	<b>LEVEL</b>	<b>VENTILATION RECOMMENDATION</b>
	>61%	Greatly increased
	20 to 61%	Significantly increased
AQI Table	10 to 20%	Slightly increased
	5 to 10%	Average
	0 to 5%	Target value

#### RH SENSOR OPTION

HS Sensor	Thin-film capacitive, replaceable
Accuracy*	±2% from 10 to 80% RH @ 25 °C (77 °F) ±1%, ±2% replaceable models
Hysteresis	1.5% typical
Linearity	Included in accuracy specification
Stability	±1% @ 20°C (68 °F) annually for 2 years
Output Range	0 to 100% RH
Temperature Coefficient	±0.1% RH/°C above or below 25 °C (77 °F) typical

#### TEMPERATURE SENSOR OPTION

User configuration	°C or °F
Sensor Type	Solid state, integrated circuit
Temp. Sensing Element**	See Ordering Information on page 2 for available temp. sensing elements
Time Constant	Air velocity 1.5 m/s. approx. 72 s; Air velocity 3.0 m/s. approx. 52 s
Accuracy***	±0.2 °C (±0.4 °F) typical at 25 °C



**SPECIFICATIONS (CONT.)**

Resolution	0.1 °C (0.1 °F)
Range	0 to 50 °C (32 to 131 °F)
<b>PM SENSOR OPTION</b>	
Sensor Type	Laser-scatter
Particulate Size	PM1.0, PM2.5, PM4.0, PM10
Resolution	±1 µg/m <sup>3</sup>
Mass Concentration Range	±1 µg/m <sup>3</sup>
Accuracy****	PM 1 and PM 2.5: ±10 µg/m <sup>3</sup> (0 to 100 µg/m <sup>3</sup> ), ±10% (100 to 1000 µg/m <sup>3</sup> ) PM 4 and PM 10: ±25 µg/m <sup>3</sup> (0 to 100 µg/m <sup>3</sup> ), ±25% (100 to 1000 µg/m <sup>3</sup> )

**DISPLAY MODELS**

LCD Type	Positive display with backlight
Measurement Values Displayed	CO <sub>2</sub> : ppm, Temp: °C or °F, Humidity: % RH, VOC: % AQI, PM: µg/m <sup>3</sup>
Display Resolution	CO <sub>2</sub> : 1 ppm, Temp: 0.1 °C or °F, Humidity: 0.1% RH VOC: 1% AQI, PM: 1 µg/m <sup>3</sup>

**WIRING TERMINALS**

Terminal Blocks	Screwless terminal block with spring actuator, 16-24 AWG
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**WARRANTY**

Limited Warranty	5 years
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**COMPLIANCE INFORMATION**

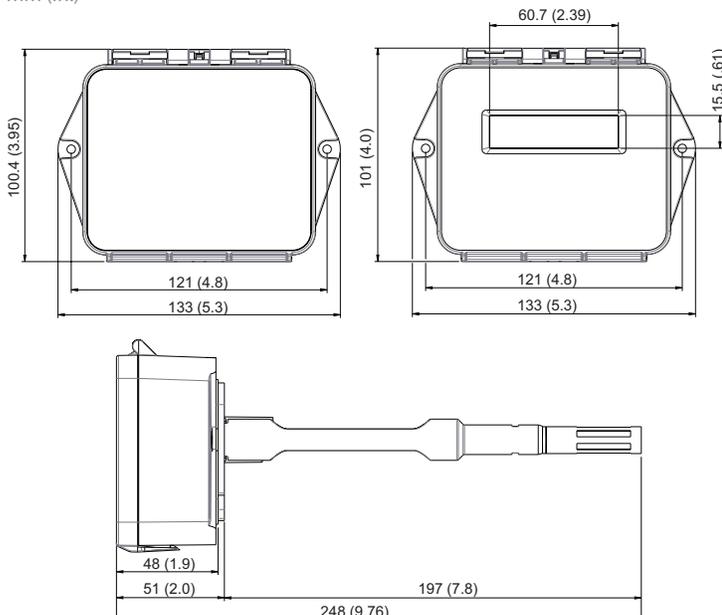
Agency Approvals	UL 916 European conformance CE: EN61000-6-2, EN61000-6-3, EN61000 Series, immunity, EN 61326-1 FCC Part 15 Class A REACH, RoHS, RoHS 2 (China), RCM (Australia), ICES-003 (Canada), UKCA (UK)
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\* Humidity sensor measurement uncertainty should include: accuracy, hysteresis, temperature coefficient and stability.  
\*\*See thermistor table Z202030 for accuracy.  
\*\*\*±0.5 °C over full operating range.  
\*\*\*\*Sensor-to-sensor variation.

**DIMENSIONAL DRAWING**

mm (in.)



**WIRING DIAGRAM**

See installation guide for wiring information.

**MAXIMUM POWER CONSUMPTION**

SERIES	LCD	CO <sub>2</sub> /VOC	PM	TEMP/RH	MAX. POWER
CD2 Analog	Yes	Yes	Yes	Yes	9VA @ 24VAC
	Yes	Yes	No	Yes	8VA @ 24VAC
	Yes	No	Yes	Yes	7VA @ 24VAC
	No	Yes	No	Yes	6VA @ 24VAC
CD2 Protocol	No	Yes	No	No	4VA @ 24VAC
	Yes	Yes	Yes	Yes	4VA @ 24VAC
	Yes	Yes	No	Yes	3VA @ 24VAC
	No	Yes	Yes	Yes	2VA @ 24VAC
	Yes	Yes	No	Yes	1.5VA @ 24VAC

**ORDERING INFORMATION**

MODEL	LCD	2% RH SENSOR	TEMP.	NDIR CO <sub>2</sub>	VOC	PM
<b>Analog Models</b>						
CD2LAXAVP	X		Temp Transmitter	X	X	X
CD2LAXAVX	X		Temp Transmitter	X	X	
CD2LAXAVP	X		Temp Transmitter			X
CD2XA2AVX		X	Temp Transmitter	X	X	
CD2XA2BCX		X	100 PT RTD	X		
CD2XA2CCX		X	1000 PT RTD	X		
CD2XA2DCX		X	10K T2	X		
CD2XA2HCX		X	10K T3	X		
CD2XA2KCX		X	10K Curve G/11K	X		
CD2XA2MCX		X	20K NTC	X		
CD2XA2NCX		X	1.8K	X		
CD2XAXAVX			Temp Transmitter	X	X	
CD2XAXBCX			100 PT RTD	X		
CD2XAXCCX			1000 PT RTD	X		
CD2XAXDCX			10K T2	X		
CD2XAXHCX			10K T3	X		
CD2XAXKCX			10K Curve G/11K	X		
CD2XAXMCX			20K NTC	X		
CD2XAXNCX			1.8K	X		
<b>Protocol Models</b>						
CD2LP2AVP	X	X	Temp Transmitter	X	X	X
CD2LP2AVX	X	X	Temp Transmitter	X	X	
CD2LPXAVP	X		Temp Transmitter	X	X	X
CD2LPXAVX	X		Temp Transmitter	X	X	
CD2XP2AVP		X	Temp Transmitter	X	X	X
CD2XP2AVX		X	Temp Transmitter	X	X	
CD2XPXAVP			Temp Transmitter	X	X	X
CD2XPXAVX			Temp Transmitter	X	X	

Note: Replaceable RH and temperature modules available to be ordered separately per table below.

**REPLACEABLE RH ELEMENTS & TEMPERATURE AND HUMIDITY CALIBRATION MODULES**

MODEL	DESCRIPTION
HS1N	Replaceable RH Sensor, 1% with NIST certificate
HS2N	Replaceable RH sensor, 2% with NIST certificate
HS2X	Replaceable RH sensor, 2%
TS2*	Replaceable temperature module with 2-point calibration certificate
THS2*	Replaceable temperature and humidity module with 2-point calibration certificate

\*For temperature transmitter models only.



Replaceable RH and Temperature Module

